Thursday, December 31, 2020

Karen Waters-Husted
CH2M HILL Plateau Remediation Company
825 Jadwin Avenue
Richland, WA 99352

Re: ALS Workorder: 2012125
Project Name: CERCLA, DECEMBER 2020
Project Number: I21-009

Dear Ms. Waters-Husted:

Two water samples were received from CH2M HILL Plateau Remediation Company, on 12/7/2020. The samples were scheduled for the following analyses:

Metals
Technetium-99

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

We certify that this data package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2012125
Client Name: CH2M HILL Plateau Remediation Company
Client Project Name: CERCLA, DECEMBER 2020
Client Project Number: I21-009
Client PO Number: BOA 74395

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
B3YBF2	2012125-1		WATER	03-Dec-20	10:19
B3YBD9	2012125-2		WATER	03-Dec-20	10:19

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 5 20121 2X	C.O.C. # I21-009-002 Page 1 of 1

Collector: Juan Aguilar CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: I21-009	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: CERCLA, DECEMBER 2020	**Logbook No.:** HNF-N-506-116184	**Ice Chest No.:** GWS-C84
Shipped To (Lab): ALS Environmental Ft. Collins	**Method of Shipment** Commercial Carrier	**Bill of Lading/Air Bill No.:** 772256167124
Protocol: CERCLA	**Priority:** 30 Days	**Offsite Property No.:** N/A

POSSIBLE SAMPLE HAZARDS/REMARK
** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

SPECIAL INSTRUCTIONS
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3YBF2 1	Y	W	DEC 0 3 2020	1019	1x500-mL G/P	6010_METALS_ICP: GW 10; 6020_METALS_ICPMS: GW 06; 6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B3YBD9 2	N	W	DEC 0 3 2020	1019	1x500-mL G/P	6010_METALS_ICP: GW 10; 6020_METALS_ICPMS: GW 06; 6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B3YBD9	N	W	DEC 0 3 2020	1019	1x250-mL G/P	SMR_TC99_LSC	6 Months	HNO3 to pH <2

Relinquished By			Received By		
Print First and Last Name	*Signature*	*Date/Time*	*Print First and Last Name*	*Signature*	*Date/Time*
Juan Aguilar CHPRC		DEC 0 3 2020 1130	Jeff Lucas /CHPRC		DEC 0 3 2020 1130
Jeff Lucas /CHPRC		DEC 0 3 2020 1400	FEDEX		
FedEx			Tyler Mosser		12/7/20 0845

Matrix *

S	= Soil	DS	= Drum Solids
SE	= Sediment	DL	= Drum Liquids
SO	= Solid	T	= Tissue
SL	= Sludge	WI	= Wipe
W	= Water	L	= Liquid
O	= Oil	V	= Vegetation
A	= Air	X	= Other

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID: CHPRC Workorder No: 2012125

Project Manager: KMO Initials: RGA Date: 12/07/2020

1. Are airbills / shipping documents present and/or removable?	☐ Drop Off	☑ YES	☐ NO
2. Are custody seals on **shipping** containers intact?	☐ NONE	☑ YES	☐ NO*
3. Are custody seals on **sample** containers intact?	☐ NONE	☑ YES	☐ NO*
4. Is there a COC (chain-of-custody) present?		☑ YES	☐ NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		☑ YES	☐ NO*
6. Are short-hold samples present?		☐ YES	☑ NO
7. Are all samples within holding times for the requested analyses?		☑ YES	☐ NO*
8. Were all sample containers received intact? (not broken or leaking)		☑ YES	☐ NO*
9. Is there sufficient sample for the requested analyses?		☑ YES	☐ NO*
10. Are samples in proper containers for requested analyses? (form 250, *Sample Handling Guidelines*)		☑ YES	☐ NO*
11. Are all aqueous samples preserved correctly, if required?	☐ N/A	☑ YES	☐ NO*
12. Were unpreserved samples pH checked, if required?	☑ N/A	☐ YES	☐ NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	☑ N/A	☐ YES	☐ NO
14. Were the samples shipped on ice?		☑ YES	☐ NO
15. Were cooler temperatures measured at 0.1 - 6.0°C? IR gun used*: ☐ #3 ☑ #5	☐ Rad Only	☑ YES	☐ NO

Cooler #:	1	2	3
Temperature (°C):	2.4	3.1	0.9
# of custody seals on cooler:	2	2	2
External mR/hr reading:	11	11	10
Background mR/hr reading:	9		

Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) ☐ N/A ☑ YES ☐ NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: RGA

If applicable, was the client contacted? ☐ YES ☐ N/A Contact Name Date:

Project Manager Signature / Date: 12/8/20

Form 201r30.xls
(06/04/2020)

+IR Gun #3, VWR SN 170647571
+IR Gun #5, VWR SN 192272629

ORIGIN ID:PSCA (509) 376-0951
IVAN SCHAEFFER

6267 LATAH ST.

RICHLAND, WA 99354
UNITED STATES US

SHIP DATE: 03DEC20
ACTWGT: 27.00 LB
CAD: 107066051/INET4280

BILL THIRD PARTY

TO JULIE ELLINGSON
ALS GLOBAL - FORT COLLINS
225 COMMERCE DRIVE

FORT COLLINS CO 80524
(970) 490-1511 REF: CHARGE300072/GWS-694
INV:
PO: DEPT:

10-2
0.9

568J291936766

FedEx Express

FRI - 04 DEC 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7722 5616 7124

DSR
80524
CO-US DEN

XH FTCA

ORIGIN ID:PSCA (509) 376-0951
IVAN SCHAEFFER

6267 LATAH ST.

RICHLAND, WA 99354
UNITED STATES US

SHIP DATE: 04DEC20
ACTWGT: 98.00 LB
CAD: 107066051/INET4280

BILL THIRD PARTY

TO JULIE ELLINGSON
ALS GLOBAL - FORT COLLINS
225 COMMERCE DRIVE

11-2
3.1

FORT COLLINS CO 80524
(970) 490-1511 REF: CHARGE300072/GWS-036
INV:
PO: DEPT:

568J291958766

FedEx Express

SATURDAY 12:00P
PRIORITY OVERNIGHT

TRK# 0201 7722 6829 9480

DSR

X0 FTCA

80524
CO-US DEN

FedEx Ship Manager - Print Your Label(s)

12/4/2020

ORIGIN ID:PSCA (509) 376-0951
IVAN SCHAEFFER
6267 LATAH ST.
RICHLAND, WA 99354
UNITED STATES US

SHIP DATE: 04DEC20
ACTWGT: 97.00 LB
CAD: 107066051/INET4280

BILL THIRD PARTY

TO JULIE ELLINGSON
ALS GLOBAL - FORT COLLINS
225 COMMERCE DRIVE

FORT COLLINS CO 80524
(970) 490-1511 REF: CHARGE300072/GWS-161
INV:
PO: DEPT:

11-2
2.4

569.0/919568766

FedEx Express

SATURDAY 12:00P
PRIORITY OVERNIGHT

TRK# 0201 7722 6790 5412

DSR
80524
CO-US DEN

X0 FTCA

FedEx Ship Manager - Print Your Label(s)

12/4/2020

Metals

Case Narrative

CH2M HILL Plateau Remediation Company

CERCLA, DECEMBER 2020 – I21-009

Work Order Number: 2012125

1. The samples were prepared and analyzed based on SW-846, 3rd Edition procedures.

   For analysis by Trace ICP and ICP-MS, the samples were digested following method 3005A and the current revision of SOP 806.

2. Analysis by Trace ICP followed method 6010D and the current revision of SOP 834.

3. Analysis by ICP-MS followed method 6020B and the current revision of SOP 827.

4. All standards and solutions are NIST traceable and were used within their recommended shelf life.

5. The samples were prepared and analyzed within the established hold time.

All in house quality control procedures were followed, as described below.

6. General quality control procedures.

   - A preparation (method) blank and laboratory control sample were digested and analyzed with the samples in this digestion batch.
   - The preparation (method) blank associated with this digestion batch was below the reporting limit for the requested analytes. Sample results have been compared to the blank results and are flagged as appropriate.
   - All laboratory control sample criteria were met.
   - All initial and continuing calibration blanks were below the reporting limit for the requested analytes.
   - All initial and continuing calibration verifications were within the acceptance criteria for the requested analytes.

- The interference check samples and high standard read-backs associated with Method 6010D were within acceptance criteria.
- The interference check samples associated with Method 6020B were analyzed.

7. Matrix specific quality control procedures.

   Sample 2012237-1 was designated as the quality control sample for each analysis. Results for the shared quality control samples are included at the client's request.

   Similarity of matrix and therefore relevance of the QC results should not be automatically inferred for any sample other than the native sample selected for QC.

   - A matrix spike and matrix spike duplicate were digested and analyzed with each batch. All acceptance criteria for accuracy and precision were met.
   - A serial dilution was analyzed with each ICP batch. All acceptance criteria were met.

8. It is a standard practice that samples for ICP-MS are analyzed at a dilution. The 5X factor can be considered an artifact of the prep and does not indicate a secondary dilution and is therefore not flagged as a dilution.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Megan Johnstone — 12/28/20
Inorganics Primary Data Reviewer — Date

Inorganics Final Data Reviewer — 12/30/20
Date

Inorganic Data Reporting Qualifiers

The following qualifiers are used as needed by the laboratory when reporting results of inorganic analyses.

- Result qualifier -- A “B” is entered if the reported value was obtained from a reading that was less than the Reporting Limit but greater than or equal to the Method Detection Limit (MDL). If the analyte was analyzed for but not detected a “U” is entered. For samples, negative values are reported as non-detects (“U” flagged). For blanks, if the absolute value of the negative value is above the MDL and below the reporting limit, then the result is “B” flagged.

- QC qualifier -- Specified entries and their meanings are as follows:

  E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

  M - Duplicate injection precision was not met.

  N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

  Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

  * - Duplicate analysis (relative percent difference) not within control limits.

  S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

  C - The analyte was detected in both the sample and the associated QC blank, and the sample concentration was <=20X the blank concentration.

  D - Analyte was reported at a secondary dilution factor, typically DF>1 (i.e., the primary preparation required dilution to either bring the analyte within the calibration range or to minimize interference). Required for organics/wetchem if the sample was diluted.

Dissolved IRON

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins
Client Name: CH2M HILL Plateau Remediation Company
Client Project ID: CERCLA, DECEMBER 2020 I21-009
Work Order Number: 2012125 **Final Volume:** 50 ml
Reporting Basis: As Received **Matrix:** WATER
Analyst: Steve Workman **Result Units:** UG/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	RptLimit/ LOQ/LOD	MDL/DL	Flag	Sample Aliquot
B3YBF2	2012125-1	12/3/2020	12/21/2020	12/22/2020	N/A	1	44	100	44	U	50 ml

Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: *IT2012125-1*

Total Recoverable IRON

Method SW6010D

Sample Results

Lab Name: ALS -- Fort Collins
Client Name: CH2M HILL Plateau Remediation Company
Client Project ID: CERCLA, DECEMBER 2020 I21-009
Work Order Number: 2012125 **Final Volume:** 50 ml
Reporting Basis: As Received **Matrix:** WATER
Analyst: Steve Workman **Result Units:** UG/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	RptLimit/ LOQ/LOD	MDL/DL	Flag	Sample Aliquot
B3YBD9	2012125-2	12/3/2020	12/21/2020	12/22/2020	N/A	1	170	100	44		50 ml

Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: *IT2012125-1*

Dissolved ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Field ID: B3YBF2
Lab ID: 2012125-1

Analysis ReqCode: 6020_METALS_I

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 03-Dec-20
Date Extracted: 21-Dec-20
Date Analyzed: 22-Dec-20
Prep Method: SW3005 Rev A

Prep Batch: IP201221-5
QCBatchID: IP201221-5-5
Run ID: IM201222-10A3
Cleanup: NONE
Basis: As Received
File Name: 026SMPL.

Analyst: Jill M. Latelle
Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-47-3	CHROMIUM	5	2.4	U	5	2.4
7439-96-5	MANGANESE	5	2.4	U	5	2.4
7439-98-7	MOLYBDENUM	5	31		1	0.23
7440-02-0	NICKEL	5	1.3	U	10	1.3
7440-61-1	URANIUM	5	4.6		0.05	0.02

Data Package ID: *IM2012125-1*

Total Recoverable ICPMS Metals

Method SW6020B

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Field ID: B3YBD9
Lab ID: 2012125-2

Analysis ReqCode: 6020_METALS_I

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 03-Dec-20
Date Extracted: 21-Dec-20
Date Analyzed: 22-Dec-20
Prep Method: SW3005 Rev A

Prep Batch: IP201221-5
QCBatchID: IP201221-5-5
Run ID: IM201222-10A3
Cleanup: NONE
Basis: As Received
File Name: 027SMPL.

Analyst: Jill M. Latelle
Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Result Qualifier	Reporting Limit	MDL
7440-47-3	CHROMIUM	5	3.3	B	5	2.4
7439-96-5	MANGANESE	5	32		5	2.4
7439-98-7	MOLYBDENUM	5	31		1	0.23
7440-02-0	NICKEL	5	2.7	B	10	1.3
7440-61-1	URANIUM	5	4.7		0.05	0.02

Data Package ID: *IM2012125-1*

ICP Metals

Method SW6010D

Method Blank

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Lab ID: IP201221-5MB

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 21-Dec-20
Date Analyzed: 22-Dec-20

Prep Batch: IP201221-5
QCBatchID: IP201221-5-2
Run ID: IT201222-1A3
Cleanup: NONE
Basis: N/A
File Name: 201222A.

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
Clean DF: 1

CASNO	Target Analyte	DF	Result	Result Qualifier	Reporting Limit	MDL
7439-89-6	IRON	1	44	U	100	44

Data Package ID: *IT2012125-1*

ICP Metals

Method SW6010D

Laboratory Control Sample

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Lab ID: IP201221-5LCS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 12/21/2020
Date Analyzed: 12/22/2020
Prep Method: SW3005A

Prep Batch: IP201221-5
QCBatchID: IP201221-5-2
Run ID: IT201222-1A3
Cleanup: NONE
Basis: N/A
File Name: 201222A.

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7439-89-6	IRON	1000	973	100		97	80 - 120%

Data Package ID: *IT2012125-1*

ICP Metals

Method SW6010D

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Field ID: SHARED QC
LabID: 2012237-1MS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 10-Dec-20
Date Extracted: 21-Dec-20
Date Analyzed: 22-Dec-20
Prep Method: SW3005 Rev A

Prep Batch: IP201221-5
QCBatchID: IP201221-5-2
Run ID: IT201222-1A3
Cleanup: NONE
Basis: As Received

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
File Name: 201222A.

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7439-89-6	IRON	360		1330		100	1000	97	80 - 120%

Field ID: SHARED QC
LabID: 2012237-1MSD

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 10-Dec-20
Date Extracted: 21-Dec-20
Date Analyzed: 22-Dec-20
Prep Method: SW3005 Rev A

Prep Batch: IP201221-5
QCBatchID: IP201221-5-2
Run ID: IT201222-1A3
Cleanup: NONE
Basis: As Received

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
File Name: 201222A.

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7439-89-6	IRON	1320		1000	96	100	20	1

Data Package ID: *IT2012125-1*

Prep Batch ID: IP201221-5

Start Date: 12/21/20
Start Time: 12:29
Prep Analyst: Tyler S. Sabo

End Date: 12/21/20
End Time: 18:00

Concentration Method: NONE
Extract Method: SW3005A
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: tss
Date Created: 12/21/20
Time Created: 12:29
Validated By: tss
Date Validated: 12/21/20
Time Validated: 13:37

Comments:

QC Batch ID: IP201221-5-2

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP201221-5	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237
IP201221-5	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237
2012237-1	MS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237
2012237-1	MSD	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237
2012125-1	SMP	B3YBF2	WATER	12/3/2020	50	50	NONE	1	2012125
2012125-2	SMP	B3YBD9	WATER	12/3/2020	50	50	NONE	1	2012125
2012237-1	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard	
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample	
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification	
LOQV	Limit of Quantitation Verification	MB	Method Blank	
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate	
REP	Sample replicate	RVS	Reporting Level Verification Standar	
SMP	Field Sample	SYS	Sample Yield Spike	

ICPMS Metals

Method SW6020B

Method Blank

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Lab ID: IP201221-5MB

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 21-Dec-20
Date Analyzed: 22-Dec-20

Prep Batch: IP201221-5
QCBatchID: IP201221-5-5
Run ID: IM201222-10A3
Cleanup: NONE
Basis: N/A
File Name: 020SMPL.

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
Clean DF: 1

CASNO	Target Analyte	DF	Result	Result Qualifier	Reporting Limit	MDL
7440-47-3	CHROMIUM	5	2.4	U	5	2.4
7439-96-5	MANGANESE	5	2.4	U	5	2.4
7439-98-7	MOLYBDENUM	5	0.23	U	1	0.23
7440-02-0	NICKEL	5	1.3	U	10	1.3
7440-61-1	URANIUM	5	0.02	U	0.05	0.02

Data Package ID: *IM2012125-1*

ICPMS Metals

Method SW6020B

Laboratory Control Sample

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Lab ID: IM201221-5LCS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: N/A
Date Extracted: 12/21/2020
Date Analyzed: 12/22/2020
Prep Method: SW3005A

Prep Batch: IP201221-5
QCBatchID: IP201221-5-5
Run ID: IM201222-10A3
Cleanup: NONE
Basis: N/A
File Name: 021SMPL.

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7440-47-3	CHROMIUM	500	454	5		91	80 - 120%
7439-96-5	MANGANESE	100	91.6	5		92	80 - 120%
7439-98-7	MOLYBDENUM	100	82.8	1		83	80 - 120%
7440-02-0	NICKEL	500	476	10		95	80 - 120%
7440-61-1	URANIUM	10	9.3	0.05		93	80 - 120%

Data Package ID: *IM2012125-1*

ICPMS Metals

Method SW6020B

Matrix Spike And Matrix Spike Duplicate

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Field ID: SHARED QC
LabID: 2012237-1MS

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 10-Dec-20
Date Extracted: 21-Dec-20
Date Analyzed: 22-Dec-20
Prep Method: SW3005 Rev A

Prep Batch: IP201221-5
QCBatchID: IP201221-5-5
Run ID: IM201222-10A3
Cleanup: NONE
Basis: As Received

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
File Name: 039SMPL.

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-47-3	CHROMIUM	66		521		5	500	91	75 - 125%
7439-96-5	MANGANESE	3.6	B	97.7		5	100	94	75 - 125%
7439-98-7	MOLYBDENUM	8.2		97.4		1	100	89	75 - 125%
7440-02-0	NICKEL	18		498		10	500	96	75 - 125%
7440-61-1	URANIUM	49		58.6		0.05	10	92	75 - 125%

Field ID: SHARED QC
LabID: 2012237-1MSD

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 10-Dec-20
Date Extracted: 21-Dec-20
Date Analyzed: 22-Dec-20
Prep Method: SW3005 Rev A

Prep Batch: IP201221-5
QCBatchID: IP201221-5-5
Run ID: IM201222-10A3
Cleanup: NONE
Basis: As Received

Sample Aliquot: 50 ml
Final Volume: 50 ml
Result Units: UG/L
File Name: 040SMPL.

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-47-3	CHROMIUM	511		500	89	5	20	2
7439-96-5	MANGANESE	95.4		100	92	5	20	2
7439-98-7	MOLYBDENUM	98.1		100	90	1	20	1
7440-02-0	NICKEL	486		500	94	10	20	2
7440-61-1	URANIUM	58		10	87	0.05	20	1

Data Package ID: *IM2012125-1*

Prep Batch ID: IP201221-5

Start Date: 12/21/20
Start Time: 12:29
Prep Analyst: Tyler S. Sabo

End Date: 12/21/20
End Time: 18:00

Concentration Method: NONE
Extract Method: SW3005A
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: tss
Date Created: 12/21/20
Time Created: 12:29
Validated By: tss
Date Validated: 12/21/20
Time Validated: 13:37

Comments:

QC Batch ID: IP201221-5-5

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
IP201221-5	MB	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237
IM201221-5	LCS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237
2012237-1	MS	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237
2012237-1	MSD	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237
2012125-1	SMP	B3YBF2	WATER	12/3/2020	50	50	NONE	1	2012125
2012125-2	SMP	B3YBD9	WATER	12/3/2020	50	50	NONE	1	2012125
2012237-1	SMP	XXXXXX	WATER	XXXXXX	50	50	NONE	1	2012237

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard	
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample	
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification	
LOQV	Limit of Quantitation Verification	MB	Method Blank	
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate	
REP	Sample replicate	RVS	Reporting Level Verification Standar	
SMP	Field Sample	SYS	Sample Yield Spike	

Technetium-99

Case Narrative

CH2M HILL Plateau Remediation Company

CERCLA, DECEMBER 2020 – I21-009

Work Order Number: 2012125

1. The sample was prepared according to the current revision of SOP 755, with procedure modifications outlined in QASS #378635 and #387636.

2. The sample was analyzed for the presence of ^{99}Tc according to the current revision of SOP 704. The analysis was completed on 12/28/2020.

3. The duplicate of sample 2012239-2 is shared for this work order. The duplicate was performed on a CH2M HILL Plateau Remediation Company sample and the results are acceptable. The results can be found in the following report.

4. The analysis results for this sample are reported in units of pCi/L. The sample was not filtered prior to analysis.

5. In accordance with project specific instructions, the evaluation threshold for Relative Percent Difference (RPD) has been set at 20%. RPD is defined as:

$$RPD = \frac{/S - D/}{(S + D)/2} * 100$$

Where: S = sample activity result and D = duplicate activity result. RPD is not evaluated for sample/duplicate pairs where the reported activity for either is less than 5 times the sample specific MDC, as indicated with an "NC" on the Duplicate Sample Results (RPD) page.

6. The magnitude of the negative activity for shared QC sample 2012239-2 is greater than the 2 sigma TPU. The analyst's review of the data does not indicate a problem with the instrument data or the subsequent reporting systems. It is believed that the data quality is unaffected and the results are submitted without qualification. Under typical conditions, where background level sample data is normally distributed and analyzed by paired observations, this event is likely to occur at least 2.5% of the time.

7. No anomalous situations were encountered during the preparation or analysis of this sample. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Jean Anderson — 12/31/20
Jean Anderson — Date
Radiochemistry Primary Data Reviewer

Radiochemistry Final Data Reviewer — 12/31/20
Radiochemistry Final Data Reviewer — Date

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 13

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Lab ID: TC201217-3MB

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 17-Dec-20
Date Prepared: 17-Dec-20
Date Analyzed: 28-Dec-20

Prep Batch: TC201217-3
QCBatchID: TC201217-3-1
Run ID: TC201217-3A
Count Time: 90 minutes

Final Aliquot: 100 ml
Result Units: pCi/l
File Name: Z20201228_1014

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	-4.68E-01 +/- 1.90E+00	3.36E+00	2.00E+01	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	1.110E+04	1.05E+04	Pci	94.4	40 - 110 %	

Comments:

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Data Package ID: *TC2012125-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 13

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Lab ID: TC201217-3LCS

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 17-Dec-20
Date Prepared: 17-Dec-20
Date Analyzed: 28-Dec-20

Prep Batch: TC201217-3
QCBatchID: TC201217-3-1
Run ID: TC201217-3A
Count Time: 30 minutes

Final Aliquot: 100 ml
Result Units: pCi/l
File Name: Z20201228_1338

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14133-76-7	Tc-99	2.01E+03 +/- 3.23E+02	6.08E+00	2.280E+03	88.4	75 - 125	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	1.110E+04	1.04E+04	Pci	93.8	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

Data Package ID: *TC2012125-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 13

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Field ID: Shared QC
Lab ID: 2012239-2

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 10-Dec-20
Date Prepared: 17-Dec-20
Date Analyzed: 27-Dec-20

Prep Batch: TC201217-3
QCBatchID: TC201217-3-1
Run ID: TC201217-3A
Count Time: 30 minutes
Report Basis: Unfiltered

Final Aliquot: 100 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Z20201227_0733

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	-3.47E+00 +/- 2.95E+00	6.02E+00	2E+01	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	1.110E+04	1.03E+04	Pci	93.0	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TC2012125-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 13

Sample Duplicate Results

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Field ID: Shared QC
Lab ID: 2012239-2DUP

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 10-Dec-20
Date Prepared: 17-Dec-20
Date Analyzed: 27-Dec-20

Prep Batch: TC201217-3
QCBatchID: TC201217-3-1
Run ID: TC201217-3A
Count Time: 30 minutes
Report Basis: Unfiltered

Final Aliquot: 100 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Z20201227_0733

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	-2.79E+00 +/- 2.99E+00	5.96E+00	2E+01	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	1.110E+04	1.04E+04	Pci	93.2	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

D - DER is greater than Control Limit of 3

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TC2012125-1*

Date Printed: Thursday, December 31, 2020

ALS -- Fort Collins

LIMS Version: 7.012

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 13

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Field ID: Shared QC
Lab ID: 2012239-2DUP

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 10-Dec-20
Date Prepared: 17-Dec-20
Date Analyzed: 27-Dec-20

Prep Batch: TC201217-3
QCBatchID: TC201217-3-1
Run ID: TC201217-3A
Count Time: 30 minutes
Report Basis: Unfiltered

Final Aliquot: 100 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Z20201227_0733

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
14133-76-7	Tc-99	-3.47E+00 +/- 2.95E+00	6.02E+00	U	-2.79E+00 +/- 2.99E+00	5.96E+00	U	0.321	3

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
D - DER is greater than Control Limit of 3
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:
TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *TC2012125-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 13

Duplicate Sample Results (RPD)

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Field ID: Shared QC
Lab ID: 2012239-2DUP

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 10-Dec-20
Date Prepared: 17-Dec-20
Date Analyzed: 27-Dec-20

Prep Batch: TC201217-3
QCBatchID: TC201217-3-1
Run ID: TC201217-3A
Count Time: 30 minutes
Report Basis: Unfiltered

Final Aliquot: 100 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Z20201227_0733

CASNO	Analyte	Sample			Duplicate			RPD	RPD Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
14133-76-7	Tc-99	-3.47E+00 +/- 2.95E+00	6.02E+00	U	-2.79E+00 +/- 2.99E+00	5.96E+00	U	NC	20

Comments:

Qualifiers/Flags:

+ - Duplicate RPD not within limits.
U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
NC - Not Calculated for duplicate results less than 5 times MDC

Abbreviations:

TPU - Total Propagated Uncertainty
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *TC2012125-1*

Technetium-99 by Liquid Scintillation

PAI 704_Tc99 Rev 13

Sample Results

Lab Name: ALS -- Fort Collins
Work Order Number: 2012125
Client Name: CH2M HILL Plateau Remediation Company
ClientProject ID: CERCLA, DECEMBER 2020 I21-009

Field ID: B3YBD9
Lab ID: 2012125-2

Analysis ReqCode: SMR_TC99_LSC

Sample Matrix: WATER
Prep SOP: PAI 755 Rev 12
Date Collected: 03-Dec-20
Date Prepared: 17-Dec-20
Date Analyzed: 27-Dec-20

Prep Batch: TC201217-3
QCBatchID: TC201217-3-1
Run ID: TC201217-3A
Count Time: 30 minutes
Report Basis: Unfiltered

Final Aliquot: 100 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: Z20201227_0733

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	1.35E+02 +/- 2.40E+01	5.87E+00	2E+01	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	1.110E+04	1.06E+04	Pci	95.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TC2012125-1*

Prep Batch ID: TC201217-3

Start Date: 12/17/20
Start Time: 7:23
Prep Analyst: Tambrae Elhart

End Date: 12/17/20
End Time: 7:23

Concentration Method: NONE
Extract Method: PAI 75512
Initial Volume Units: ml
Final Volume Units: ml

Batch Created By: tde
Date Created: 12/17/20
Time Created: 7:23
Validated By: tde
Date Validated: 12/18/20
Time Validated: 12:55

Comments:

Reduced aliquot of 25mL taken on 2012276-21 due to high Beta activity.

QC Batch ID: TC201217-3-1

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
TC201217-3	MB	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012125
TC201217-3CB1	MB	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012125
TC201217-3CB2	MB	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012125
TC201217-3CB3	MB	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012125
TC201217-3	LCS	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012125
2012239-2	DUP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012239
2012125-2	SMP	B3YBD9	WATER	12/3/2020	100	100	NONE	1	2012125
2012173-3	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012173
2012206-1	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012206
2012209-1	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012209
2012236-4	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012236
2012238-1	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012238
2012239-2	SMP	XXXXXX	WATER	XXXXXX	100	100	NONE	1	2012239

QC Types

CAR	Carrier reference sample	DLS	Detection Limit Standard	
DUP	Laboratory Duplicate	LCS	Laboratory Control Sample	
LCSD	Laboratory Control Sample Duplicat	LODV	Limit of Detection Verification	
LOQV	Limit of Quantitation Verification	MB	Method Blank	
MS	Laboratory Matrix Spike	MSD	Laboratory Matrix Spike Duplicate	
REP	Sample replicate	RVS	Reporting Level Verification Standar	
SMP	Field Sample	SYS	Sample Yield Spike	

ALS Laboratory Group - Fort Collins

QUALITY ASSURANCE SUMMARY SHEET

PAR W.O. # / BATCH Generic
TEST Tc99
METHOD Prep
SOP/REV (PREP) 755
SOP/REV (ANAL) _____

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

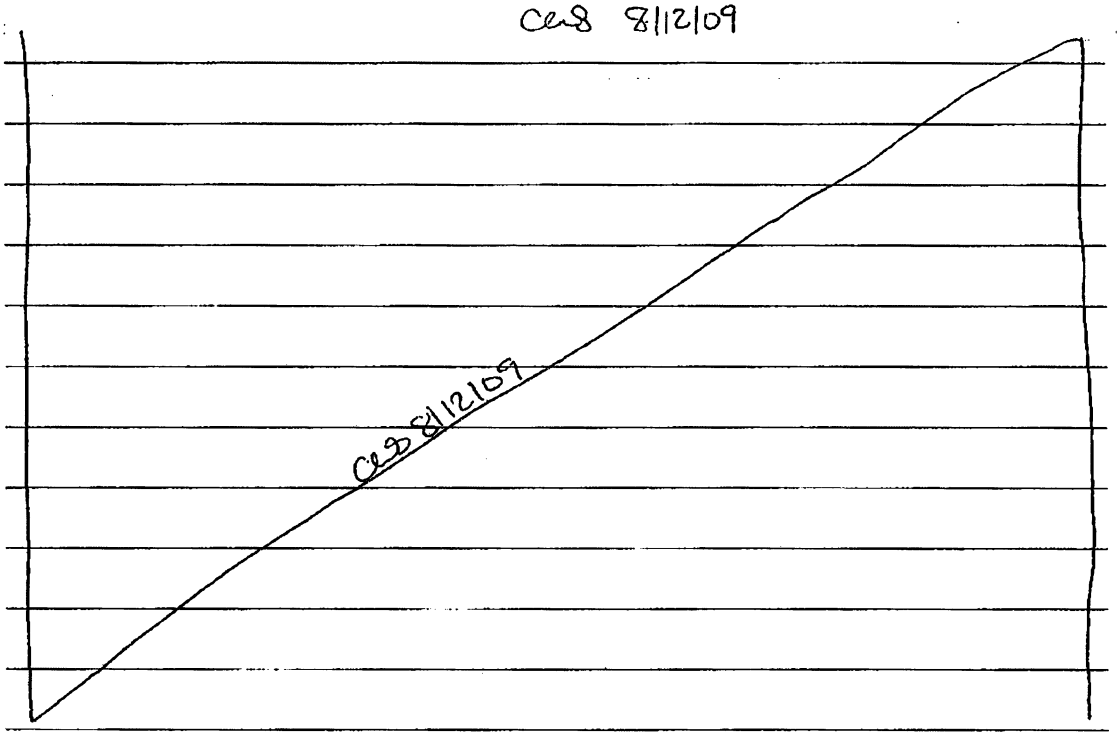
CWS 8/12/09

CWS 8/12/09

CWS 8/12/09

Due to possible matrix interference, a ferric hydroxide precipitation was performed on all samples per SOP 755, section 8.2.10

CWS 8/12/09



TECHNICIAN/ANALYST Crystal Shreffler DATE 8/12/09

DEPARTMENT MANAGER [signature] DATE 8/12/09

378635 FORM 302r6.doc (4/22/04)

ALS Laboratory Group - Fort Collins

QUALITY ASSURANCE SUMMARY SHEET

PAR W.O. # / BATCH General
TEST Tc99
METHOD Prep
SOP/REV (PREP) 755
SOP/REV (ANAL) _____

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

CWS 8/12/09

$Tc99^m$ 711.2613.17 was used as a tracer for this batch. It has a half-life of 6 hours and therefore must be delivered the day of prep and diluted to a working level solution. The procedure noted below is standard for all $Tc99^m$ dilutions.

1. Open the Pb shielded container and carefully remove the vial containing the Tc99m primary standard.
2. Withdraw a 1 mL aliquot of the $Tc99^m$ primary standard from the vial using a 10 mL syringe fitted with a hypodermic needle. Dispense the aliquot into a disposable beaker that contains ~100 mL of DI water. Cap and mix well. This intermediate solution is a 1/100x dilution of the primary standard.
3. Using a 10 mL syringe, transfer 10 mL of the intermediate solution prepared in step 2 into a disposable beaker that contains ~70 mL of DI water. Cap and mix well. This working standard solution is a 1/800x dilution of the primary standard.

CWS 8/12/09

CWS 8/12/09

Attach ver

CardinalHealth
CARDINAL HEALTH 414, LLC
DENVER
10400 48TH AVE.STE B
DENVER CO 80238
303.373.0579

Rx# 147098
Date Ordered : 20Oct2020
Date/Time Prepared : 21Oct2020 00:51 MT
ALS LABORATORY GROUP
225 COMMERCE DR
FORT COLLINS CO 80524-2762
1 0430 Fort Collins

Safetrac™ CH102964

Patient : Per Physician Order
Product : Tc-99m Sodium Pertechnetate Unit Dose mCi (HO)
Disp Amt : 0.54 mCi
Calibration: 21Oct2020 08:00 MT
Patient ID :
Ordered Amount : 0.50 mCi
Volume : 10.00 ml
Conc. : 0.05 mCi/ml

CAUTION
RADIOACTIVE MATERIALS

Source - Not for Human Use For Calibration Use Only
Indication : Point Source mCi
Dispense Date : 21Oct2020 Lot# : E20295-0001 Price(est) : N/A
Use By : 22Oct2020 00:51 MT Physician : Charles Orchard, RSO NPT :
Notes NDC : RPh : A.Worthem

Caution Federal law prohibits dispensing without a prescription - Rx only All Tc-99m drugs are below 0.15 uCi of Mo-99/mCi of Tc-99m at BUC

TECHNICIAN/ANALYST Crystal Shreffler DATE 8/12/09

DEPARTMENT MANAGER _____ DATE 8/12/09

378636 FORM 302r6.doc (4/22/04)